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NOVEL METHOD FOR LIVE TRANSMISSION POWER STEALING AND SEIZING

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ABSTRACT

The novel technique proposed before to improves the structure of current coupling device in single-phase or three phases electric power measuring equipment and two high frequency coupling windings are added to each current coupling device. The novel technique proposed based on live data transmission from source to destination. At the same time, the advanced ARM microprocessor is implemented for sampling the data and real-time computation. The resultant data of power theft will send on server side and accordingly a proper action will be taken by the authorities. To avoid this problem this is the simple and most efficient technique. In India electricity theft leads to annual losses estimated at US$4.5 billion, about 1.5 percent of GDP.

KEYWORDS: Arm Processor, Real-Time Computation

INTRODUCTION

The existing electricity-stealing methods are multifarious, but many of them have quite effective techniques to prevent, such as voltage method electricity-stealing, phase shifter method electricity-stealing, error enlargement method electricity-stealing, and so on.

In this paper we proposed a system by considering electricity theft problem, electric theft capturing technology based on live data transmission from source to destination technique by considering voltage parameter from the principle of energy measurement. The system consists of two areas; consumer side and supplier side, which communicate with each other through live data transmission technique. The whole proposed system architecture based on GSM/GPRS network. The proposed software module also incorporates different data aggregation algorithms, electricity measuring and information transmission foot marks. This design effectively provide solutions for problems faced by India's electricity distribution department such as power theft, and transmission line fault.

PROPOSED ARCHITECTURE FOR LIVE TRANSMISSION OF POWER

We proposed system architecture based on GPRS network. The architecture consist of two areas namely consumer side and supplier side. The proposed system architecture shown in Figure 1.

Department side communicate with area side via GPRS network. Virtually it shows that consumer directly sending data to supplier but actually it takes place through various networks

Figure 1: Proposed Architecture

HARDWARE IMPLEMENTATION FOR LIVE TRANSMISSION OF POWER

Microcontroller

The key philosophy behind ARM is its simplicity. The ARM7 is a RISC computer with small instruction set and consequently a less gate count. This makes it ideal for embedded systems. It has high performance, low power consumption and it takes a small amount of available silicon die area [6].

In this project LPC 2148 is used. The ARM7 CPU has two instruction sets-The ARM instruction set which has 32 bit wide instructions and THUMB instruction set which has 16 bit wide instructions

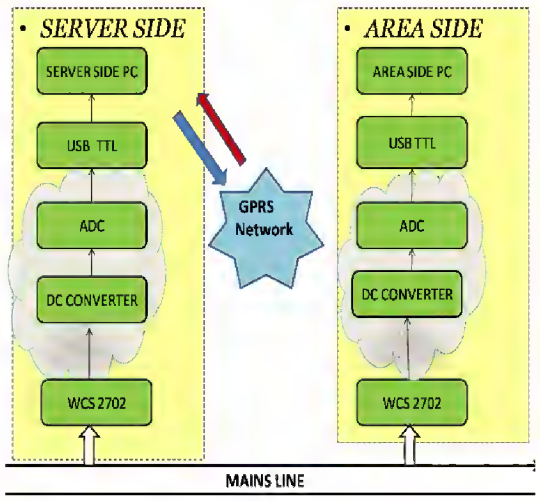

Figure 2: Hardware Implementation for Live Transmission of Power Block Diagram

The LPC2141/48 microcontrollers are based on a 16-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, which combine microcontroller with embedded high speed flash memory ranging from 32 kb to 512 kb. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty.

Due to their tiny size and low power consumption, LPC214148 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kb up to 40 kb, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems[6].

Current Sensor

The Winson WCS2702 provides economical and precise solution for both DC and AC current sensing in industrial, commercial and communications systems [4].

Figure 3: Flow Chart for Proposed Model

The WCS2702 features are it has low noise signal path, its internal conductor resistance is 110 mΩ having minimum sensing current 0~2.0A at 5V voltage supply. This extremely low resistance can effectively reduce power loss, operating temperature and increase the reliability greatly. Its operating voltage range is 3.0~12 V having bandwidth of 10 KHz. The working of the IC basically depends on Hall Effect. Current flowing through this conduction path generates magnetic field which is sensed by Hall Effect IC and convert it into proportional voltage The terminals of the conductive path are electrically isolated from the sensor leads. This allows the WCS2702 current sensor to be used in applications requiring electrical isolation without the use of opto-isolators or other costly isolation techniques and make system more competitive in cost [4].

EXPERIEMENTAL RESULTS

Area Side

- Select COM port
- Click on connect. It will display message 'Port is configured'.
- It will show consumption power in serial live data window

Figure 4: Area Side Data Log

Departmental Side

- Click on select port
- Click on connect
- Connect GPRS
- Check serial data on departmental side as well as on area side which is going to be sent by GPRS.
- If difference is more than 25, it will display message 'Power is being theft'.

Figure 5: Department Side Data Log

Features

The proposed system provides the solution for some of the main problems faced by the existing electricity supply system, such as

- Wastage of energy, power theft, manual billing system, and transmission line fault.
- This method will save a lot of energy for future use.
- Area can be detected from where the power is being theft which was not possible before.
- Enhanced use of energy.
- Real time theft capturing.
- Currently used energy meters can be modified into this sensor, so no need to replace currently used energy meters.

FUTURE SCOPE

In future, this project can be implemented and endorsed in remote areas. Future enhancements can be incorporated for three phase electric distribution system in India. Along with all this new architectural components can be incorporated, so that the system can be completely used for optimizing the energy consumption. This method will reduce the energy wastage and save a lot of energy for future use. Zigbee module can also be used in place of GPRS module.

CONCLUSIONS

By implementing this paper one can reduce heavy power losses and save a large amount of power that occurs due to power theft by the customers. By informing respective authorities, manually power theft can be curbed. By using an

automatic circuit breaker one can break power supply of remotely based house or consumer automatically. The given proposed system sends data digitally to a remote station using live data transmission with the help of GPRS technique. Finally the conclusion is that, we can overcome on the problems like wastage of energy, power theft, and transmission line fault with the help of proposed system.

REFERENCES

1. R. Devidas, M. V. Ramesh, "Wireless Smart Grid Design for Monitoring and Optimizing Electric Transmission in India," IEEE 2010 Fourth International Conference on Sensor Technologies and application.
2. "National Electricity Policy," The Gazette of India, EXTRAORDINARY PART I - Section 1, Ministry of Power, New Delhi, Dated the 12th, February, 2005, RESOLUTION No. 23/40/2004-R&R (Vol.II)
3. Koninklijke Philips Electronics N.V. 2005 Date of release: 7 September 2005 Document number: 9397 750 14985 Published in the Netherlands.
4. Winson semiconductor corporation, www.winson.com.tw
5. rhydolabz.com
6. The insider guide to the Philips ARM7 based microcontroller,www.hitex.co.uk/arm
7. "Electrical Power Supply System for India," www.wikipedia.org, February 2010.
8. Zhang Cheng, GeJianhua, Yu Hui, Zhang Xianlin "ET Gravimeter Data Collecting System Based on GPRS" The Eighth International Conference on Electronic Measurement and Instruments 2007
9. Gujing Han, Weiping Luo "A Novel Technique for for Preventing Current Method Electricity-stealing", IEEE 2010978-1-4244-4813-5/10